

WHAT IS CLAIMED IS:

1. A method of fabricating a chemical array using:
a head system with multiple groups of drop dispensers which move in unison,
each group having multiple dispensers;
a transport system to move the head system with respect to a substrate with
different dispensers of the groups following respective paths;
a processor to dispense droplets from dispensers during operation of the
transport system, in a pattern along a selected path for each group so as to form the array;
the method comprising:
 - a) identifying an error in one or more dispensers;
 - b) when a dispenser of a first group is in error, then moving a second dispenser of
each group along the selected path for its group while dispensing droplets from at least the
second dispenser of the first group in at least part of the pattern for the selected path of the
first group.
2. A method according to claim 1 wherein in step (b) droplets are dispensed from
each second dispenser of multiple groups in at least part of the pattern for the selected path of
the same group.
3. A method according to claim 2 wherein:
a series of dispensers within each group is loaded with a same fluid; and
in step (b) droplets are dispensed from a non-error dispenser of the same series
as the error dispenser.
4. A method according to claim 2 wherein:
a series of dispensers within a group communicate with a corresponding
common reservoir for that series; and
in step (b) droplets are dispensed from a non-error dispenser of the same series
as the error dispenser.
5. A method according to claim 1 wherein the dispensers are pulse jets.

6. A method according to claim 2 wherein in step (b) the droplets are dispensed from at least one second dispenser of a group in the complete pattern for the first dispenser of the same group.
7. A method according to claim 2 wherein in step (b) the droplets are dispensed from at least the second dispenser of the first group, in the complete pattern for the selected path of the first group.
8. A method according to claim 2 wherein when a second dispenser of a second group is additionally in error, the first and second dispensers of each group are alternately moved along the selected path for that group while droplets are dispensed from non-error dispensers of the first and second groups in at least part of the pattern for the selected paths for the first and second groups.
9. A method of fabricating a chemical array using:
a head system with multiple groups of dispenser which move in unison, each group having multiple rows and columns of dispensers;
a transport system to move the head system with respect to a substrate with different rows following respective paths;
a processor to dispense droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group, so as to form the array; the method comprising:
a) identifying for an error in one or more dispensers;
b) when dispensers of different columns within first and second rows of a first group are in error, then:
 (i) positioning the head with a first row of each group aligned with the selected path for that group;
 (ii) moving the head with respect to the substrate while dispensing droplets from non-error dispensers in the first row of the first group in accordance with a part of the pattern for the selected path for that group;

(iii) re-positioning the head such that a second row of each group is aligned with the selected paths; and

(iv) moving the head with respect to the substrate while dispensing droplets from non-error dispensers in the second row of the first group in accordance with a part of the pattern for that group.

10. A method according to claim 10 wherein the dispensers are pulse jets.
11. A method according to claim 10 wherein in step (b)(iv) droplets are dispensed from non-error dispensers in the second row of each of multiple groups in accordance with at least part of the pattern for that group.
12. A method according to claim 10 wherein:
- a series of dispensers in each of multiple columns of each of multiple groups, communicates with a corresponding common reservoir for that series; and
- in step (b)(iv) droplets are dispensed from a non-error dispenser of the same series as the error dispenser.
13. A method according to claim 12 wherein in step (b)(iv) droplets are dispensed from at least one second row of a group in the complete pattern for the selected path of the same group.
14. An apparatus for fabricating a chemical array, comprising:
- (a) a head system with multiple groups of drop dispensers which move in unison, each group having multiple drop dispensers;
- (b) a transport system to move the head system with respect to a substrate with different dispensers of the groups following respective paths;
- (c) a processor which:
- dispenses droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group so as to form the array; and
- when an error indication is identified by the processor indicating an error in a first dispenser of a first group, then moves a second dispenser of each group along the

selected path for its group while dispensing droplets from at least the second dispenser of the first group in at least part of the pattern for the selected path of the first group.

15. An apparatus according to claim 15 wherein the dispensers are pulse jets.
16. An apparatus according to claim 15 wherein the processor, when the error indication is identified, dispenses droplets from each second dispenser of multiple groups in at least part of the pattern for the selected path of the same group.
17. An apparatus according to claim 17 wherein:
a series of dispensers within a group communicate with a corresponding common reservoir for that series; and
when the error indication is identified, the processor dispenses droplets from a non-error dispenser of the same series as the error dispenser.
18. An apparatus according to claim 17 wherein, when the error indication is identified, the processor dispenses droplets from at least one second dispenser of a group in the complete pattern for the selected path of the same group.
19. An apparatus according to claim 17 wherein, when the error indication is identified, the processor dispenses droplets from at least the second dispenser of the first group in the complete pattern for the selected path of the first group.
20. A method according to claim 17 wherein when another error indication is identified by the processor additionally indicating an error in a dispenser of a second dispenser of a second group, the processor alternately moves the first and second dispensers of each group along the selected path for that group while dispensing droplets from non-error dispensers of the first and second groups in different parts of the pattern for the selected path for the first group.
21. An apparatus for fabricating a chemical array, comprising:

- (a) a head system with multiple groups of drop dispensers which move in unison, each group having multiple rows and columns of dispensers;
- (b) a transport system to move the head system with respect to a substrate with different rows following respective paths;
- (c) a processor which:
- dispenses droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group so as to form the array;
when an error indication is identified by the processor indicating an error in dispensers of different columns within first and second rows of a first group, then:
- (i) positions the head with a first row of each group aligned with the selected path for that group;
- (ii) moves the head with respect to the substrate while dispensing droplets from non-error dispensers in the first row of the first group in accordance with a part of the pattern for the selected path for that group;
- (iii) re-positions the head such that a second row of each group is aligned with the selected paths; and
- (iv) moves the head with respect to the substrate while dispensing droplets from non-error dispensers in the second row of the first group in accordance with a part of the pattern for that group.

22. An apparatus according to claim 22 wherein the dispensers are pulse jets.
23. An apparatus according to claim 22 wherein in step (iv) droplets are dispensed from non-error dispensers in the second row of each of multiple groups in accordance with at least part of the pattern for that group.
24. An apparatus according to claim 22 wherein:
a series of dispensers in each of multiple columns of each of multiple groups, communicates with a corresponding common reservoir for that series; and
in step (iv) droplets are dispensed from a non-error dispenser of the same series as the error dispenser.

SuJt A3

25. An apparatus according to claim 22 wherein in step (iv) droplets are dispensed from at least one second row of a group in the complete pattern for the selected path of the same group.

26. An apparatus according to claim 20 additionally comprising a sensor to monitor dispensers for an error and provide corresponding data to the processor.

27. A computer program product for use with an apparatus for fabricating a chemical array having:

a head system with multiple groups of drop dispensers which move in unison, each group having multiple dispensers;

a transport system to move the head system with respect to a substrate with different dispensers of the groups following respective paths; and

a processor;

the computer program product comprising a computer readable storage medium having a computer program stored thereon which, when loaded into the processor, performs the steps of:

a) identifying for an error in one or more dispensers;

b) when a dispenser of a first group is in error, then moving a second dispenser of each group along a selected path for its group while dispensing droplets from at least the second dispenser of the first group in at least part of the pattern for the selected path of the first group.

SuJt A3

28. A computer program product according to claim 28 wherein in step (b) droplets are dispensed from each second dispenser of multiple groups in at least part of the pattern for the selected path of the same group.

29. A computer program product according to claim 28 wherein when a dispenser of a second set of the first group is additionally identified as being in error, the program causes the first and second dispensers of each group to be alternately moved along the selected path for that group while droplets are dispensed from non-error dispensers of the first and second groups in different parts of the pattern for the selected path for the first group.

000101